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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.        | CONFIRMATION NO.       |
|--|-------------|----------------------|----------------------------|------------------------|
| 10/693,302   | 10/24/2003  | Balaji Rathakrishnan | MSFT-2848/306822.1         | 1494                   |
| 23377 7590 11/15/2007<br>WOODCOCK WASHBURN LLP<br>CIRA CENTRE, 12TH FLOOR<br>2929 ARCH STREET<br>PHILADELPHIA, PA 19104-2891 |             |                      | EXAMINER<br>ORTIZ, BELIX M |                        |
|  |             |                      | ART UNIT<br>2164           | PAPER NUMBER           |
|  |             |                      | MAIL DATE<br>11/15/2007    | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/693,302

Applicant(s)

RATHAKRISHNAN ET AL.

Examiner

Belix M. Ortiz

Art Unit

2164

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### Remarks

1. In response to communications files on 4-September-2007. Claims 1-22 are presently pending in the application.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-6, 8-13, and 15-21 are rejected under 35 U.S.C. 103(a) (Eff. Filing date of application: 10/24/2003) as being unpatentable over Suver (U.S. patent 6,013,497) (Eff. Filing date of application 12/24/1997) in view of Krishnaprasad et al. (U.S. patent 6,564,203) (Eff. Filing date of application: 2/24/2000).

As to claims 1 and 15, Suver teaches representing modifications to values in the complex structured type column using a data structure that aggregates changes to the values at arbitrary levels of a hierarchy of the complex structured column (see abstract; col. 1, lines 62-66; col. 2, lines 1-5; col. 2, lines 53-62; col. 3, lines 19-24; and col. 10, lines 16-23); and

computing the data structure in response to a data modification statement on the database to determine which values within the complex structured type column to update with the aggregated changes (see column 26, lines 52-67).

Suver does not teach a method of updating values in a complex structured type column in a relational database system.

Krishnaprasad et al. teaches defining instead of triggers over nested collection columns of views (see abstract), in which he teaches a method of updating values in a complex structured type column in a relational database system (see abstract and column 1, lines 15-20).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Suver by the teaching of Krishnaprasad et al., because a method of updating values in a complex structured type column in a relational database system, would enable a method “An instead-of trigger is a trigger that is invoked in response to a request to modify the database through a view associated with the instead-of-trigger, such as a request to perform an update, insert, or delete operation upon a view”, (see Krishnaprasad et al., col. 4, lines 35-40).

As to claim 2, Suver as modified teaches a method comprising the further step of simultaneously updating multiple scalar values at different levels within the hierarchy of the complex structured type column (see Krishnaprasad et al., abstract; figure 1; and column 3, lines 32-42).

As to claim 3, Suver as modified teaches a method comprising the further step of simultaneously updating a scalar value in a table along with a complex structured type value in a complex structured type column of said relational database system (see Krishnaprasad et al., abstract; figure 1; and column 3, lines 32-42).

As to claim 4, Suver as modified teaches a method comprising the further step of embedding an INSERT/UPDATE/DELETE statement inside a SET clause of an UPDATE statement (see Suver, column 18, lines 15-22 and column 22, lines 18-22).

As to claim 5, Suver as modified teaches a method comprising the further step of embedding a plurality of nested SET clauses inside an outer-most UPDATE statement corresponding to each layer within the hierarchy of the complex structured type column (see Krishnaprasad et al., figure 1; column 2, lines 28-33; column 5, lines 14-16; and column 6, lines 4-12).

As to claim 6, Suver as modified teaches wherein the computing step comprises the steps of updating only indexes affected by specific scalar fields modified at various nesting levels by the SET clause in the UPDATE statement and updating only those rows of the index that correspond to the actual values that are modified by the UPDATE statement (see Krishnaprasad et al., abstract; claim 5; and column 2, lines 40-48).

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As to claims 8 and 18, Suver teaches a parser that parses a database modification statement and produces a description of changes to the database proposed by the database modification statement (see column 21, lines 57-60); and

a query optimizer that produces an execution algorithm to implement the database modification statement (see claim 3 and column 18, lines 57-64).

a query execution engine that uses the execution algorithm to compute a data structure of the database modification statement to determine which values within a complex structured type column are to be updated, wherein the data structure represents values in the complex structured type column as an aggregation of changes to the values at arbitrary levels of a hierarchy of the complex structured type column (see abstract; col. 1, lines 62-66; col. 2, lines 1-5; col. 2, lines 53-62; col. 3, lines 19-24; and col. 10, lines 16-23) and said query execution engine applies the changes to the values in the complex structured type column that are to be updated (see col. 26, lines 52-67).

Suver has combined on claim 1, teaches a relational database system responsive to database modification statements to store and update values in at least one complex structured type column (see abstract and column 1, lines 15-20).

As to claim 9, Suver as modified teaches wherein the query execution engine simultaneously updating multiple scalar values at different levels within the hierarchy of the complex structured type column (see Krishnaprasad et al., abstract; figure 1; and column 3, lines 32-42).

As to claim 10, Suver as modified teaches wherein the query execution engine simultaneously updating a scalar value in a table along with a complex structured type value in a complex structured type column of said relational database system (see Krishnaprasad et al., abstract; figure 1; and column 3, lines 32-42).

As to claims 11 and 19, Suver as modified teaches wherein the parser parses a SET clause of an UPDATE statement (see Suver, column 18, lines 158-22 and column 22, lines 18-22).

As to claim 12, Suver as modified teaches wherein the parser parses the UPDATE statement in a plurality of nested SET clauses inside an outermost UPDATE statement corresponding to each level within the hierarchy of the complex structured type column (see Suver, column 18, lines 158-22 and column 22, lines 18-22).

As to claims 13 and 21, Suver as modified teaches wherein the query execution engine updating only indexes affected by specific scalar fields modified at various nesting levels by the SET clause in the UPDATE statement and updating only those rows of the index that correspond to the actual values that are modified by the UPDATE statement (see Suver, column 18, lines 158-22 and column 22, lines 18-22).

As to claim 16, Suver as modified teaches a method comprising the further step of simultaneously updating multiple scalar values at different levels within the hierarchy of the collection-valued column (see Krishnaprasad et al., abstract; figure 1; and column 3, lines 32-42).

As to claim 17, Suver as modified teaches a method comprising the further step of simultaneously updating a scalar value in a table along with a value in a collection-valued column of said relational database system (see Krishnaprasad et al., abstract; figure 1; and column 3, lines 32-42).

As to claim 20, Suver as modified teaches wherein the parser parses the UPDATE statement in a plurality of nested SET clauses inside an outermost UPDATE statement corresponding to each level within the collection-valued column (see Suver, column 18, lines 158-22 and column 22, lines 18-22).

4. Claims 7, 14, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suver (U.S. patent 6,013,497) (Eff. Filing date of application 12/24/1997) in view of Krishnaprasad et al. (U.S. patent 6,564,203) (Eff. Filing date of application: 2/24/2000) as applied to claims 1-6, 8-13, 15-21 above, and further in view of Graefe et al. (U.S. patent 6,122,644) (Eff. Filing date of application: 7/1/1998).



As to claims 7 and 14, Suver as modified does not teach a method comprising the further step/wherein the query execution engine applying the aggregated changes to the complex structured type column, wherein the applying step is separate from the computing step so as to provide Halloween Protection.

Graefe et al. teaches system for Halloween protection in a database system (see abstract) in which he teaches a method comprising the further step of applying the aggregated changes to the complex structured type column, wherein the applying step is separate from the computing step so as to provide Halloween Protection (see figure 6 and column 5, lines 13-15).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Suver by the teaching of Graefe et al., because a method comprising the further step of applying the aggregated changes to the complex structured type column, wherein the applying step is separate from the computing step so as to provide Halloween Protection, would enable a method because, "Halloween protection is provided in the update plan by considering various other operators in addition to the eager spool operator and at locations anywhere in an update plan not just on

the input side of an update operator. The Halloween protection system of the present invention provides improved update efficiency by interleaving the search and update phases to the full extent possible while still maintaining the required semantics, i.e., the search then update semantics of set-at-a-time pipelining, in the update plan", (see Graefe et al., column 3, lines 16-25).

As to claim 22, Suver as modified does not teach a method comprising the further step/wherein the query execution engine applying the aggregated changes to the collection-valued column, wherein the applying step is separate from the computing step so as to provide Halloween Protection.

Graefe et al. teaches system for Halloween protection in a database system (see abstract) in which he teaches a method comprising the further step of applying the aggregated changes to the collection-valued column, wherein the applying step is separate from the computing step so as to provide Halloween Protection (see figure 6 and column 5, lines 13-15).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Suver by the teaching of Graefe et al., because a method comprising the further step of applying the aggregated changes to the collection-valued column, wherein the applying step is separate from the computing step so as to provide Halloween Protection, would enable a method because, "Halloween protection is provided in the update plan by considering various other operators in addition to the eager spool operator and at locations anywhere in an update plan not just on the input side of an update operator. The Halloween protection system of the present invention provides improved update efficiency by interleaving the search and update phases to the full extent possible while still maintaining the required semantics, i.e., the search then update semantics of set-at-a-time pipelining, in the update plan", (see Graefe et al., column 3, lines 16-25).

***Response to Arguments***

5. Applicant's arguments filed 13- July- 2007 with respect to the rejected claims in view of the cited references have been fully considered but they are not found persuasive:

In response to applicants' arguments that "Suver, fail to teach or suggest representing modifications to values in the complex structured type column using a data structure that aggregates changes to the values at arbitrary levels of a hierarchy of the complex structured column"; the arguments have been fully considered but are not deemed persuasive, because Suver teaches "Rather, embedded data is not stored in a separate table, but is stored directly in a complex column comprising embedded data. The embedded data can be collections of data items, structures, or collections of structures. The structures can have further levels of embedded data (more collections and/or structures" (see Suver, col. 3, lines 19-24).

"The present invention allows storage of further hierarchically nested data, such as a collection of HOME telephone numbers as a "sub-sub-table" within the Phones structure.

(32) The foregoing illustrates that successive levels of nesting or hierarchical embedding are supported in the present invention. Any given column may contain a collection or a structure for storing data elements, and any given structure may itself contain further embedded collection or structure", (see Suver, col., 10, lines 16-23).

***Conclusion***

Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

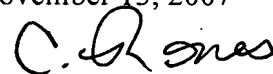
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Belix M. Ortiz whose telephone number is 571-272-4081. The examiner can normally be reached on Monday-Friday 9am-5pm. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

bmo

November 13, 2007



**CHARLES RONES**  
**SUPERVISORY PATENT EXAMINER**